



## What are critical features in diagnosing CAS?

- Limited early babbling/sound play ["Babbling" wondertime.com 11/08]
- Sound inventory restrictions
- Imitation skills much better than volitional skills [Edy Strand's DTTC]
- Sequencing struggles
- Word/Sentence Complexity breakdown [Videos - Caleb, age 8]

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## What are critical features to look for in diagnosing CAS?

- Inconsistency in various forms [Video Clip - Jacob, age 3]

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## What are critical features to look for in diagnosing CAS?

- Inconsistency in various forms
- Sound harmony/variegation
- Vowel distortions/centralization
- Voiced/Voiceless sound errors
- Prosodic deviancies
- "Groping" behaviors
- Sound omissions

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## AdHoc Committee's 3 Consensus Features

- Inconsistent errors on consonants and vowels in repeated productions of syllables or words
- Lengthened & disrupted coarticulatory transitions between sounds & syllables
- Inappropriate prosody, especially in relation to lexical or phrasal stress

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## AdHoc Committee's Definition of CAS

- "Childhood apraxia of speech (CAS) is a neurological childhood (pediatric) speech sound disorder in which the precision and consistency of movements underlying speech are impaired in the absence of neuromuscular deficits (e.g. abnormal reflexes, abnormal tone)."

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## Which children tend to be misdiagnosed or over- diagnosed?

- (1) the nonverbal child
- (2) the dysarthric child
- [Comment by Dr. Ray Kent]
- [Video - Anna, age 8-1]

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## Which children tend to be misdiagnosed or over-diagnosed?

- (1) the nonverbal child
- (2) the dysarthric child [Video - Anna, age 8-1]
- (3) the severely phonologically disordered child
- (4) the confounding diagnosis child. [Video - Zachary, age 6]

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## What does my CAS evaluation include?

- For young children, most is informal but formal tests available on market. [Article - McCauley and Strand, 2008]
- Securing in-depth parent information. [ProEFA's/specialized diets - CASANA] [additional parent ?aire - handout]
- Investigating other apraxic features.
- Looking at nonspeech oral skills. [May have mixed oral/verbal apraxia]

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## What else do I look for in a CAS evaluation?

- All forms of alternative/augmentative communication used. (AAC device/PECS/signing) [Example - Amanda, age 5-9]

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## What else do I look for in a CAS evaluation?

- All forms of alternative/augmentative communication used. (AAC device/PECS/signing)
- Child's response to cueing strategies [Video Clip - Mark, age 7]

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## Is pure apraxia rare? **ABSOLUTELY!!!**

Most have other issues so that even if the apraxia resolves, other challenges need to be addressed over time.

Parents tend to think all else will "go away" when apraxia resolves.

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## Can CAS totally resolve?

- Pilot study with three 16-year-olds.
- One had "resolved apraxia"
- One had resolved mild articulation deficit
- One had normal speech and language
- Put through a battery of extremely challenging speech-motor tasks.

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## What about genetics and CAS?

- Dr. Larry Shriberg most noted SLP researcher/expert on genetics and CAS
- Most cited study - KE family in England
- Fox P2 gene mutations found
- Studies show Fox P2 gene is essential for developing the full articulatory power of human language
- High levels of Fox P2 located in basal ganglia, also being implicated in autism

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## What about genetics?

- Zebra Finch Songbird Study out of Max Plank Institute in Germany, and Duke & Northwestern University Medical Centers
- Zebra finches have 2 distinct brain paths (1 for babble song & 1 for mature song).
- "Male tweet tutor" sits in middle of circle to teach male courtship song.
- Fox P2 knocked out of some "students".
- Resulted in different "tweets" from tutor so could not learn courtship song :(

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## So...what are the songbird study conclusions?

- Language is uniquely human, but it has components such as the ability to create new sound.
- The Zebra Finch creates new sounds like instrumental music and may do that using the same genes as humans.
- Bird song learning may contain clues to human speech disorders, including CAS.

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## What do we need to talk about with parents at the diagnosis level?

- AdHoc committee documents support "suspected apraxia" or "working dx".
- Inform parents that 3-5% of children with speech disorders have apraxia, so many therapists see few on caseloads.
- Provide resources - starter packet.
- Discuss varied outcomes [Pilot Study by Dr. Tom Campbell]

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## What are the outcomes for children with apraxia?

- Pilot Outcome Study looked at "less than half" - "about 3/4" clarity change
- On average, 151 therapy sessions were needed to produce a "functional" intelligibility outcome for children with apraxia of speech compared to an average of 29 sessions for children with phonological disorders!!!

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## Audience Participation in Diagnosis of CAS

- Video Clip of Bennett, age 3-6
- Will stop video for each section to discuss features you have observed.

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